CERTIFICATION

I, Yukie KOJO, of 1-2-16 Tennou, Ichinomiya-shi, Aichi-ken, 491-0046, Japan, accompanying certified copy of the documents in respect of an application for a patent filed in Japan on the 18 day of February, 1998 and of the official certificate attached thereto, and certify that the following is a true and correct translation to the best of my knowledge and belief.

Yukie Kojo

Dated this 2 day of May, 2003

PCT/JP98/03222

日 本 国 特 許 庁

16.07.98

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Applicant(s) : TOYOTA SHATAI KABUSHIKI KAISHA

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[Document] Abstract 1

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INTERIOR MEMBER FOR AIR BAG

[Scope of Claims for a Patent]

[Claim 1]

An interior member for an air bag comprising a main body having an air bag swelling-out port, a cover body closing the air bag swelling-out port and forming a thin wall portion which is ruptured at a time when the air bag is swollen out, in a part thereof, and the main body and the cover body being integrally molded by a synthetic resin material, characterized in that said cover body is provided with a rib on a back face of a portion forming no thin wall portion in a protruding manner, a metal connection member extending from a side of said main body is connected to said rib, a projection is formed on a front face of said connection member, and said projection eats into the front face of said rib at a time of connecting said connection member to said rib.

[Detailed Description of the Invention]

[0001]

[Technical Field Pertinent to the Invention]

The present invention relates to an interior member for an air bag, and more particularly to a shatterproof structure of a cover body integrally molded with a main body of the interior member and closing an air bag swelling-out port thereof.

[0002]

[Prior Art]

In recent years, there has been provided an air bag for a front

passenger seat and a so-called side air bag for improving a safety, and in this case, the air bag is placed in an inner side of an interior member made of synthetic resin such as an instrument panel, a door trim or the like, and is swollen out into a passenger room from an air bag swelling-out port provided in this interior member. Further, generally, this air bag swelling-out port is closed by a cover body (an air bag cover) having a thin wall portion which is easily ruptured at a time when the air bag is swollen.

[0003]

In the air bag cover, in order to prevent the air bag cover from being cracked into pieces at a time when the air bag is swollen out, physical properties such as a required flexibility and a required tensile strength are different from those of the instrument panel or the like. Accordingly, in conventional art, the air bag cover is manufactured as a separate body from the instrument panel or the like which is made of a hard synthetic resin material or the like and is attached over an opening edge of the air bag swelling-out port by means of a screw fastening or the like. One example is shown in Fig. 10, and this drawing is an exploded perspective view of a front passenger seat side portion of an instrument panel 1'. In Fig. 10, an approximately quadrangular air bag swelling-out port 13 is formed on an upper surface of the instrument panel 1', an opening peripheral wall 14 thereof protrudes into the instrument panel 1', and a plurality of mounting holes 15 are provided on a wall surface in a front side wall portion 141 of the opening peripheral wall 14. An air bag cover 7 closing the air bag swelling-out port 13 is structured such that a cover main body 71 is formed in an approximately quadrangular shape along the air bag swelling-out port 13, and a front line thereof is bent downward at right

angles so as to form a rectangular connection piece 72.

[0004]

The connection piece 72 is provided with a plurality of mounting holes 73 in a longitudinal direction, and the cover main body 71 comes in close contact with an opening inner periphery of the air bag swelling-out port 13 in a state in which the connection piece 72 is inserted into the air bag swelling-out port 13, whereby the air bag cover 7 closes the air bag swelling-out port 13. The mounting hole 73 of the connection piece 72 is aligned with the mounting hole 15 of the front side wall portion 141, the connection piece 72 and the front side wall portion 141 are covered with a retainer 8 having a U-shaped cross section, made of metal and provided with a similar mounting hole 81 from the below in this state, and they are connected by a bolt penetrated into the mounting hole 81. When the air bag (not shown) placed within the air bag swelling-out port 13 is swollen out, the cover main body 71 of the air bag cover 7 is rotated and opened upward around a boundary between the cover main body 71 and the connection piece 72 corresponding to a hinge portion. At this time, a force for pulling up to an upper side is applied to the cover main body 71, however, since the connection piece 72 is connected to the front side wall portion 141 of the air bag swelling-out port 13 by bolts, the air bag cover 7 is not scattered.

[0005]

[Problem to be solved by the Invention]

However, in the case that the instrument panel 1' and the air bag cover 7 are separately formed as in the conventional art, a lot of labor hour is required for manufacturing and assembling. Accordingly, it is considered that they are integrally molded in accordance with a two-color

molding or the like, however, in this case, it is required a structure which can securely prevent the air bag cover from being scattered.

[0006]

The present invention solves the problem mentioned above, and an object thereof is to provide an interior member for an air bag which securely prevent a cover body integrally molded with an interior member main body from being scattered.

[0007]

[Means for Solving Problem]

In order to achieve the objects mentioned above, in accordance with the present invention, there is provided an interior member for an air bag comprising a main body (11) having an air bag swelling-out port (12), a cover body (2) closing the air bag swelling-out port (12) and forming a thin wall portion (24) which is ruptured at a time when the air bag is swollen out, in a part thereof, and the main body (11) and the cover body (2) being integrally molded by a synthetic resin material, in which the cover body (2) is provided with a rib (23) on a back face of a portion forming no thin wall portion (24) in a protruding manner, a metal connection member (5) extending from a side of the main body (11) is connected to the rib (23), a projection (52) is formed on a front face of the connection member (5), and the projection (52) eats into the front face of the rib (23) at a time of connecting the connection member (5) to the rib (23).

[0008]

In the present invention, the thin wall portion is ruptured in accordance with the swelling-out of the air bag, and the cover body is rotated and opened within the passenger room around a portion close to a root of the rib corresponding to a hinge center. At this time, a force

for pulling up to an upper side is applied to the cover body, however, since the cover body and the connection member are connected so that the projection of the connection member eats into the rib of the cover body, the cover body does not break away from the connection member, and it is possible to securely prevent the cover body from being scattered.

[0009]

In this case, reference numerals in parentheses mentioned above show a relation of correspondence to particular means described in embodiments mentioned below.

[0010]

[Mode for Carrying out the Invention]

(First Embodiment)

In Fig. 1, there is shown an enlarged perspective view of a front passenger seat side portion of an instrument panel 1 corresponding to one embodiment of an interior member for an air bag. The instrument panel 1 is made of a thermoplastic hard synthetic resin material such as a polypropylene (PP) or the like mixed with a rubber or a filler, and an approximately rectangular air bag swelling-out port 12 is formed on an upper face of a main body 11 thereof at a center position in a back and forth direction (an oblique vertical direction in Fig. 1). Further, this air bag swelling-out port 12 is closed by an air bag cover 2 made of an olefin-based thermoplastic elastomer (TPO) integrally formed in accordance with a two-color molding. A cross section of the air bag swelling-out port 12 portion is shown in Fig. 2.

[0011]

In Fig. 2, an outer peripheral edge 21 of the air bag cover 2 is bent along a lower face of a peripheral edge of the air bag swelling-out

port 12 in the instrument panel 11, and is welded to each other. Further, an outer peripheral surface of the air bag cover 2 is stepwise lowered in an entire periphery thereof, whereby a recess groove 22 is formed with respect to an opening peripheral surface of the air bag swelling-out port 12. A plate-like rib 23 extending along a front line (a left line in Fig. 2) of the air bag cover 2, linearly protruding obliquely forward and having a fixed thickness is formed on a back face of the front line of the air bag cover 2, and a bracket 5 corresponding to a connection member mentioned in detail below is connected to this rib 23. The bracket 5 runs into an air bag case 3 in which the air bag is received, and this air bag case 3 is fixed to an insert member 13 of the instrument panel main body 11 via a bracket 31 by a bolt 43 and a nut 44.

[0012]

Back faces along three lines of the air bag cover 2 except the front line mentioned above are deep recessed in a direction of a front face, and a thin wall portion 24 which is ruptured at a time when the air bag is swollen out is formed with respect to the recess groove 22. Accordingly, in the case that the air bag is swollen, the thin wall portion 24 (Fig. 1) in three lines of the air bag cover 2 is ruptured, the air bag cover 2 is left open into a passenger room (the above in Fig. 2) around a portion near a root of the rib 23 corresponding to a hinge center, and the air bag is swollen out from the air bag swelling-out port 12.

[0013]

In this case, the bracket 5 is connected to the rib 23 as already described, details thereof will be described below. U-shaped notches 231 extending from a leading end to an inner side of the plate are formed in a leading end portion of the plate surface of the rib 23 at a plurality

of portions (four portions in the present embodiment) with intervals in a width direction, as shown in Fig. 3. The bracket 5 is obtained by forming a metal plate body with a fixed width in an approximately U-shaped curved shape, a base end 53 thereof is bonded to a side surface of the air bag case 3 (Fig. 2), and a plate surface in a leading end 54 is positioned along a lower surface of the rib 23.

[0014]

Mounting holes 51 are provided on the plate surface in the leading end 54 of the bracket 5 at the same positions as those of the notches 231 with intervals in the width direction, and a plurality of (three each on right and left in the present embodiment) projections 52 are formed in right and left positions of each of the mounting holes 51 so as to form slanted lines, as shown in Fig. 4. These projections 52 are formed in a trapezoidal shape as shown in Fig. 5, and are formed by punching the plate surface of the leading end 54 of the bracket 5 and cutting and rising (Figs. 6 and 7). The retainer plate 6 made of metal is positioned on the upper surface of the rib 23 as shown in Fig. 2, the retainer plate 6 is a long plate having an approximately equal length to a width of the rib 23 (Fig. 3), and mounting holes 61 are provided on the plate surface at the same positions as those of the notches 231 of the rib 23.

[0015]

The rib 23 and the bracket 5 are connected by aligning each of the mounting holes 61 and 51 in the retainer plate 6 and the bracket 5 with the notches 231 of the rib 23, inserting the bolt 41 (Fig. 2) to these mounting holes 61 and 51 and fastening by the nut 42. At a time of this fastening, the projection 52 formed on the plate surface of the leading end 54 of the bracket 5 eats into the plate surface of the rib 23 made

of the synthetic resin material. When the air bag is operated, the thin wall portion 24 (Fig. 1) is ruptured in accordance with the swelling-out of the air bag, and the air bag cover 2 is rotated and opened within the passenger room around a portion close to a root of the rib 23 corresponding to a hinge center. At this time, a heat of an inflator within the air bag case 3 is transmitted to the air bag cover 2, so that the force for pulling upward is applied as well as the synthetic resin material is softened. In this case, since the projection 52 of the bracket 5 eats into the rib 23 of the air bag cover 2 and both components are connected to each other, the rib 23 does not break away from the bracket 5 even when the synthetic resin material is softened in this portion. Accordingly, it is possible to securely prevent the air bag cover 2 from being scattered.

[0016]

(Other Embodiments)

The arrangement of the projections 52 is not limited to the first embodiment, but, for example, the projections 52 may be arranged linearly in the right and left positions of the mounting holes 51 as shown in Fig. 8, or may be arranged in a horseshoe shape so as to surround the mounting holes 51 as shown in Fig. 9. Further, the shape of the projections 51 is not limited to the first embodiment as far as the projections 51 easily eat into the synthetic resin material of the rib 23, but, for example, the projections 51 may be formed in a wedge shape. Further, the placing number of the projections 51 is determined in design in correspondence to the usage condition, and is not limited to the placing number of the first embodiment. In the first embodiment, the description is given of the instrument panel exemplified as the interior member made of the synthetic resin, however, a door trim or the like may be employed, and further, in

place that the base end of the bracket 5 is fixed to the air bag case, it may be fixed to a structure member in the instrument panel side or the door trim side.

[0017]

[Effect of the Invention]

As described above, in accordance with the interior member for the air bag on the basis of the present invention, it is possible to securely prevent the scattering of the cover body, which closes the air bag swelling-out port and is integrally molded with the interior member main body.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is an enlarged perspective view of a front passenger seat side portion of an instrument panel for an air bag in accordance with a first embodiment of the present invention.

[Fig. 2]

Fig. 2 is a cross sectional view along a line II-II in Fig. 1.

[Fig. 3]

Fig. 3 is a exploded perspective view of a connection portion between a rib and a bracket.

[Fig. 4]

Fig. 4 is a plan view of the bracket.

[Fig. 5]

Fig. 5 is a cross sectional view along a line V-V in Fig. 4.

[Fig. 6]

Fig. 6 is an enlarged plan view of a projection forming portion.

[Fig. 7]

Fig. 7 is a cross sectional view along a line VII-VII in Fig. 6.

[Fig. 8]

Fig. 8 is a partly enlarged plan view of a bracket in accordance with another embodiment of the present invention.

[Fig. 9]

Fig. 9 is a partly enlarged plan view of a bracket in accordance with the other embodiment of the present invention.

[Fig. 10]

Fig. 10 is an enlarged perspective view of a front passenger seat side portion of an instrument panel for an air bag, showing a prior art.

[Description of Reference Numerals]

1 ... instrument panel,

11 ... main body,

12 ... air bag swelling-out port,

2 ... air bag cover,

23 ... rib,

24 ... thin wall portion,

5 ... bracket (connection member),

52 ... projection.

Abstract

[Problem To Be Solved]

To securely prevent, from being scattered, an air bag cover integrally molded with an instrument panel main body which closes an air bag swelling-out port.

[Solution]

there is provided an interior member for an air bag comprising a main body 11 having an air bag swelling-out port 12, an air bag cover 2 closing the air bag swelling-out port 12 and forming a thin wall portion 24 which is ruptured at a time when the air bag is swollen out, on three sides thereof, and the main body 11 and the air bag cover 2 being integrally molded by a synthetic resin material. A rib 23 is installed projectedly on the air bag cover 2 on the rear surface of its one side, and the plate surface of a leading end 54 of a bracket 5 extending from the air bag case 3 is connected to the rib 23 with bolts 41 and nuts 42. The projection 52 is formed on the plate surface of the leading end 54 of the bracket 5, and the projection 52 is eaten into the plate surface of the rib 23 when the bracket 5 is connected to the rib 23.